UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/928,833	08/14/2001	Fumio Matsui	MATSUI 5	8102

7590 02/15/2007

BROWDY AND NEIMARK, P.L.L.C.
624 Ninth Street, N.W.
Washington, DC 20001-5303

EXAMINER	
ANGEBRANNDT, MARTIN J	
ART UNIT	PAPER NUMBER
1756	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/15/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/928,833	MATSUI ET AL.	
	Examiner	Art Unit	
	Martin J. Angebranndt	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,7-11 and 14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7-11 and 14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. The response of the applicant has been read and given careful consideration. Rejections of the previous office action, not repeated below are withdrawn based upon the amendment of the claims and the corresponding arguments. As the claims now recite both a capacity and a groove structure, the claims are effectively limited to pitches of approximately 0.4 microns or less (HD-DVD) and need to be able to be recorded upon using a laser of a wavelength of about 405 nm or less.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1 and 8 are rejected under 35 U.S.C. 102(e) as being fully anticipated by Ohgo et al. '072 as evidenced by Mills, J. Chem. Soc., pp. 455-466 (1922).

Ohgo et al. '072 teaches an optical recording medium in embodiment 8, where a grooved substrate is coated with a gold reflective layer and a recording layer of monomethine benzothiazine dye where R are C1-3 alkyl moieties and then and a protective layer formed as in

embodiment 1. The examiner holds that the groove pitch of the grooves is that found at 16/20 as this is the only exemplified guide groove pitch used with the 413 nm laser and the 0.8 NA head.

Mills, J. Chem. Soc., pp. 455-466 (1922) teaches that 2,2'-diethylthiocyanine iodide has two absorption maxima the stronger at 423 nm and the weaker at 400 nm. (page 461, see upper formula).

To achieve the data capacity recited, the groove pitch would have to be much smaller than 0.74 used for DVDs and likely must be 0.4 microns or less to meet the requirement as the topography otherwise wastes too much space to achieve the recited density (eg you could not record two bit data streams side by side (radially) within a single groove). With this laser and groove structure, the information capacity is above 15Gb. (HD-DVD). The spot is size is approximately (413 nm/0.8) is 0.516 microns, which is well below 1 micron.

The reference teaches an appropriate groove pitch, laser and a monomethine cyanine dye having an absorption maximum at a longer wavelength than the laser wavelength as evidenced by Mills, J. Chem. Soc., pp. 455-466 (1922).

5. Claims 1,2,7-9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Ohgo et al. '072, in view of Mills, J. Chem. Soc., pp. 455-466 (1922) and Nanba et al. JP 60-204396.

Nanba et al. JP 60-204396 teaches the absorption of dyes D32 (perchlorate) and D36 (bromide) in the table on page 29. The absorption maxima of dye D36 is 880 nm and the reflection maxima is 970 nm. The wavelength used in recording is 830 nm (page29, left column) for the examples disclosed in table 1 on page 30. **Example 3 uses dye D36, which has absorption maxima at wavelengths greater than 830 nm together with dye D32 and metal**

chelate Q3-12. The chelate is present in an amount of 4 parts to five parts of D36. The use of dyes which have an absorption maxima within the range 40 nm shorter and 70 nm longer than the writing wavelength is disclosed in the abstract. The use of lasers including HeNe (632.8 nm), Argon ion (488, 514.5 nm), HeCd (442 and 325 nm) is disclosed on page 28 in the lower left hand column. Useful counterions include perchlorate, tetrafluoroborate, aryl sulfonic acids (page 8, right hand column). Linkages disclosed include trimethine and monomethine linkages LVIII and LIX on page 8 of the reference.

To address the embodiments bounded by the claims, but not anticipated or rendered obvious above, the examiner holds that it would have been obvious to modify the medium of Ohgo et al. '072 by using other counterions, such as the perchlorate, tetrafluoroborate or aryl sulfonic acids disclosed by Nanba et al. JP 60-204396 as equivalent to iodate in the right column of page 8 with a reasonable expectation of forming a useful optical recording media. Further, it would have been obvious to add quenchers, which inherently have an absorption to stabilize the dyes as taught by Nanba et al. JP 60-204396.

6. Claims 1,2,4,7-9,11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al. JP 11-053758 and Usami et al. '122, in view of Nanba et al. JP 60-204396 and Kanno '467.

Maeda et al. JP 11-053758 (machine translation accompanys this action) teaches a substrate coated with a reflective layer, a recording layer and a protective layer. [0020]. The use of 530 nm or shorter wavelengths is discussed with wavelengths in the 350-520 nm disclosed 410 nm is also disclosed [0023-0025] Example dyes with absorptions in the 400-470 nm range are disclosed including trimethine cyanine dyes (d,c) and azo dyes (a,e) [0012-0015]. Example 1

usesNi:azo dye (a) and 515 nm with a spot size of 0.48 microns [0027-0030], example 2, uses dye (b) and 430 nm laser light [0031-0033], example 3 uses a 515 nm laser beams with a spot size of 0.48microns.

Usami et al. '122 teaches pitches for optical recording media substrates these may be 0.3-0.9 microns. (6/5-18). The use of recording layers having dyes such as cyanine, and metal (Ni,Cr) complex dyes is disclosed. (6/19-34).

Kanno '467 teaches optical recording media based upon trimethine cyanine dyes and discusses development using shorter wavelengths and higher NA to increase the data content of optical recording media due to the smaller laser spot size (3/37-51).

It would have been obvious to modify Maeda et al. JP 11-053758 by adding pregrooves with pitches of 0.3-0.4 microns as taught by Usami et al. '122 with a reasonable expectation of forming a useful optical recording medium with a higher recording capacity than those with larger pitches (ie more tracks on the medium) and to use the shorter wavelength lasers of 410 nm taught by Maeda et al. JP 11-053758 based upon the direction within Kanno et al. that this results in a smaller spot size and the direction within Nanba et al. JP 60-204396 to the use of laser wavelengths which are up to 40 nm shorter than the absorption of the dye with a reasonable expectation of being able to record small data spots resulting in increased information density which would be above 15 Gb. (that of HD-DVD) and to use mixtures of cyanine dyes as taught by Nanba et al. JP 60-204396.

The addition of Usami et al. '122 addresses the issue of groove pitch sufficient to achieve the recited recording density raised by the applicant. Further the use of short wavelength lasers

with dyes having absorption maxima in the 400-470 maxima and the use of a 410 nm laser is taught by Maeda et al. JP 11-053758.

This rejection could be obviated by reciting that the dyes has an absorption maximum at wavelengths of 450 nm or more and are able to be recorded with wavelengths in the 380-405 nm range. This undercuts the teachings of Nanba et al. JP 60-204396 which only teaches the ability to use lasers 40 nm shorter than the absorption maximum. There is a question as to if the trimethine dyes are able to sensitize the recording media on their own in this case. The examiner notes that the 4-N,N-diethylamino-4'-nitrosodiphenylamine used in the examples has an absorption maximum at 440 nm, which is within 40 nm of the laser wavelength. The applicant is invited to submit evidence of this with the next response (ie show absorption spectra and data evidencing the recording in media using these dyes with 405 nm).

7. Claims 1-4,7-11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al. JP 11-053758 and Usami et al. '122, in view of Nanba et al. JP 60-204396 and Kanno '467 and further in view of Ootaguro et al. '882.

Ootaguro et al. '882 teaches in examples 54 and 55, the coating of a solution of 3 parts cyanine dye NK 2421 (a heptamethine cyanine dyes with a perchlorate anion, see Maruyama et al. below) and 1 part 4-N,N-diethylamino-4'-nitrosodiphenylamine (the ethyl homologue of the compound used in example 1 of the instant specification) (0.33:1 ratio), which is coated on a glass substrate. 4-N,N-diethylamino-4'-nitrosodiphenylamine is disclosed as having a maximum absorption at 440 nm. (24/28). 4-N,N-dimethylamino-4'-nitrosodiphenylamine is also disclosed

(6/24-37). These compounds are disclosed as not suffering from the low solubility of other stabilizers, such as metal complexes (2/6-43).

It would have been obvious to one skilled in the art to modify the recording media resulting from the combination of Maeda et al. JP 11-053758 with Usami et al. '122, Nanba et al. JP 60-204396 and Kanno '467 by adding the light stabilizing 4-N,N-diethylamino-4'-nitrosodiphenylamine of Ootaguro et al. '882 rather than the metal chelate quenchers due to its increased solubility as with the added advantages that as it absorbs in the blue, it would confer additional sensitivity to the optical recording medium based upon the absorption maximum within 30 nm of the laser wavelength as taught by Nanba et al. JP 60-204396 and confer sensitivity at 410 nm (which is about 405 nm), if this is not already present.

What might prove to be patentable is the use of optical recording media consisting of trimethine cyanine dyes, such as those disclosed by the applicant as chemical formulae 20-38, where other absorbers/dyes are not present. This would exclude the nitroso compound used as a quencher as well due to its absorption at 440 nm. (claims 1-5,7 and 14 would have to be cancelled). The limitation of the claims to these dyes combined examples using them alone and data relating to their absorption maxima may serve to obviate the rejections of record for the method claims, in particular if the absorption maxima are evidenced to be more than 40 nm longer than 450 nm. There are not examples using these dyes without other dyes and the dyes of compounds 1-19 would not work well as they absorb soley at longer wavelengths and there is an issue of if the trimethine, styryl or azo dyes would work by themselves which is not addressed by the examples.

The applicant argues that there is no evidence that the absorption of the 4-N,N-diethylamino-4'-nitrosodiphenylamine of Ootaguro et al. '882 can sensitize the media to the laser. This is an absurd position as it is clear that the absorption of the laser is necessary to enable recording. The specific dye used of a mixture of dyes present in the recording layer does not matter as long as the laser is absorbed and the heat generated to degrade the dye mixture at that location. While the absorption of the trimethine dyes may extend to the 380-405 nm range, if thse were limited to those compounds having absorption maxima at more than 450 nm, it would seem clear that the absorption would be small and the sensitivity very poor and so would be relatively undesirable without some other absorber for the shorter wavelength.

8. Claims 1,2,4,7-9,11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al. JP 11-053758 and Usami et al. '122, in view of Nanba et al. JP 60-204396, Kanno '467 and Ootaguro et al. '882.

Kanno et al. GB 2329751 teaches that styryl dyes are better form shorter wavelength as low as 500 nm optical recording media than cyanine dyes (pages 5-9). The styryl dyes are of the formula shown on page 9. The use of quenchers or stabilizers is disclosed (page 27)

It would have been obvious to modify the media resulting from the combination of Maeda et al. JP 11-053758 with Usami et al. '122, Nanba et al. JP 60-204396, Kanno '467 and Ootaguro et al. '882 as discussed above by using styryl dyes disclosed by Kanno et al. GB 2329751 in place of the cyanine dyes with a reasonable expectation of gaining the increased sensitivity to the shorter wavelengths ascribed to the use of these dyes by Kanno et al. GB 2329751 and the clear extension of sensitivity to wavelengths of about 440 nm due to the

presence of the 4-N,N-diethylamino-4'-nitrosodiphenylamine of Ootaguro et al. '882 which is a known stabilizer quencher.

The response above is relied upon to address any arguments by the applicant.

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J. Angebranndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Martin J Angebranndt
Primary Examiner
Art Unit 1756

2/12/2007